

# **SCIENCE (Theory)**

***Time allowed : 3 hours***

***Maximum Marks : 80***

## **GENERAL INSTRUCTIONS :**

- (i) The question paper comprises of **two** sections, A and B. You are to attempt both the sections.
- (ii) All questions are compulsory.
- (iii) There is no over all choice. However internal choice has been provided in all the three questions of five marks category. Only one option in such question is to be attempted.
- (iv) All questions of section A and all questions of section B are to be attempted separately.
- (v) Question numbers 1 to 4 in section A are one mark questions. These are to be answered in one word or one sentence.
- (vi) Question numbers 5 to 13 in section A are two mark questions. These are to be answered in about 30 words each.
- (vii) Question numbers 14 to 22 in section A are three mark questions. These are to be answered in about 50 words each.
- (viii) Question numbers 23 to 25 in section A are five mark questions. These are to be answered in about 70 words each.
- (ix) Question numbers 26 to 41 in section B are multiple choice questions based on practical skills. Each question is a one mark question. You are to select one most appropriate response out of the four provided to you.

**QUESTION PAPER DELHI (CODE NO. 31/1/1)**

**SECTION - A**

1. Name the functional group present in each of the following organic compounds: 1
  - (i)  $\text{C}_2\text{H}_5\text{Cl}$
  - (ii)  $\text{C}_2\text{H}_5\text{OH}$
2. What will be the colour of the sky when it is observed from a place in the absence of any atmosphere? 1
3. Which class of chemicals is linked to the decrease in the amount of ozone in the upper atmosphere of the earth? 1
4. Bacteria and fungi are called decomposers. Why? 1
5. How can the valency of an element be determined if its electronic configuration is known? What will be the valency of an element of atomic number 9 (nine) ? 2
6. An element 'X' has atomic number 13 : 2
  - (a) Write its electron configuration.
  - (b) State the group to which 'X' belongs?
  - (c) Is 'X' a metal or a non-metal?
  - (d) Write the formula of its bromide.
7. State one genetically different feature between sperms and eggs of humans. What is its consequence? 2
8. List two advantages of vegetative reproduction practised in case of an orange plant. 2
9. List four properties of the image formed by a plane mirror. 2
10. When we place a glass prism in the path of a narrow beam of white light a spectrum is obtained. What happens when a second identical prism is placed in an inverted position with respect to the first prism? Draw a labelled ray diagram to illustrate it. 2

11. A star sometimes appears brighter and some other times fainter. What is this effect called? State the reason for this effect. 2
12. List four advantages of water stored in the ground. 2
13. "Burning fossil fuels is a cause of global warming." Justify this statement. 2
14. What are isomers? Draw the structures of two isomers of butane,  $C_4H_{10}$ . Why can't we have isomers of first three members of alkane series? 3
15. F, Cl and Br are the elements each having seven valence electrons. Which of these (i) has the largest atomic radius, (ii) is most reactive? Justify your answer stating reason for each. 3
16. Explain the meaning of sexually transmitted diseases (STDs). Give two examples of STDs each, caused due to (i) bacterial infection and (ii) viral infection. State in brief how the spread of such diseases may be prevented. 3
17. A blue colour flower plant denoted by BB is crossbred with that of white colour flower plant denoted by bb.  
(a) State the colour of flower you would expect in their  $F_1$  generation plants.  
(b) What must be the percentage of white flower plants in  $F_2$  generation if flowers of  $F_1$  plants are self-pollinated ?  
(c) State the expected ratio of the genotypes BB and Bb in the  $F_2$  progeny. 3
18. What is meant by the term speciation? List four factors which could lead to speciation. 3
19. Distinguish between homologous organs and analogous organs. In which category would you place wings of a bird and wings of a bat? Justify your answer giving a suitable reason. 3
20. State the type of mirror preferred as (i) rear view mirror in vehicles, (ii) shaving mirror. Justify your answer giving two reasons in each case. 3
21. The image of a candle flame placed at a distance of 45 cm from a spherical lens is formed on a screen placed at a distance of 90 cm from the lens. Identify the type of lens and calculate its focal length. If the height of the flame is 2 cm, find the height of its image. 3

22. A student cannot see a chart hanging on a wall placed at a distance of 3 m from him. Name the defect of vision he is suffering from. How can it be corrected? Draw ray diagrams for the (i) defect of vision and also (ii) for its correction. 3
23. What is the difference between the chemical composition of soaps and detergents? State in brief the action of soaps in removing an oily spot from a shirt. Why are soaps not considered suitable for washing where water is hard? 5

**Or**

List in tabular form three physical and two chemical properties on the basis of which ethanol and ethanoic acid can be differentiated.

24. Define the terms pollination and fertilisation. Draw a diagram of a pistil showing pollen tube growth into the ovule and label the following:  
pollen grain, male gamete, female gamete, ovary 5

**Or**

Describe in brief the role or (i) testis (ii) seminal vesicle, (iii) vas deferens, (iv) ureter and (v) prostate gland in human male reproductive system.

25. List the sign conventions for reflection of light by spherical mirrors. Draw a diagram and apply these conventions in the determination of focal length of a spherical mirror which forms a three times magnified real image of an object placed 16 cm in front of it. 5

**Or**

State the law of refraction of light that defines the refractive index of a medium with respect to the other. Express it mathematically. How is refractive index of any medium 'A' with respect to a medium 'B' related to the speed of propagation of light in two media A and B ? State the name of this constant when one medium is vacuum or air.

The refractive indices of glass and water with respect to vacuum are  $3/2$  and  $4/3$  respectively. If the speed of light in glass is  $2 \times 10^8$  m/s, find the speed of light in (i) vacuum, (ii) water.

## SECTION B

26. The colours of aqueous solutions of  $\text{CuSO}_4$  and  $\text{FeSO}_4$  as observed in the laboratory are: 1
- (A) pale green and light blue respectively
  - (B) light blue and dark green respectively
  - (C) dark blue and dark green respectively
  - (D) dark blue and pale green respectively
27. A student prepared an aqueous solution of  $\text{CuSO}_4$  in beaker X and an aqueous solution of  $\text{FeSO}_4$  in beaker Y. He then dropped some iron pieces in beaker X and some zinc pieces in beaker Y. After about 10 hours he observed that the solutions in X and Y respectively appear: 1
- (A) blue and green
  - (B) colourless and pale green
  - (C) colourless and light blue
  - (D) greenish and colourless
28. Which of the following observations is true about dilute solution of acetic acid? 1
- (A) It smells like vinegar and turns red litmus blue
  - (B) It smells like onion and turns blue litmus red
  - (C) It smells like orange and turns red litmus blue
  - (D) It smells like vinegar and turns blue litmus red
29. A student takes  $\text{Na}_2\text{CO}_3$  powder in a test tube and pours some drops of acetic acid over it. He observes : 1
- (A) no reaction in the test tube
  - (B) colourless gas with pungent smell
  - (C) bubbles of a colourless and odourless gas
  - (D) white fumes with smell of vinegar

30. A student adds 4 mL of acetic acid to a test tube containing 4 mL of distilled water. He then shakes the test tube and leaves it to settle. After about 10 minutes he observes:

1

- (A) a layer of water over the layer of acetic acid
- (B) a layer of acetic acid over the layer of water
- (C) a precipitate settling at the bottom of the test tube
- (D) a clear colourless solution

31. To determine focal length of a concave mirror a student obtains the image of a well lit distant object on a screen. To determine the focal length of the given concave mirror he needs to measure the distance between:

1

- (A) mirror and the object
- (B) mirror and the screen
- (C) screen and the object
- (D) screen and the object and also mirror and the screen

32. A student obtained a sharp image of the grills of a window on a screen using a concave mirror. His teacher remarked that for getting better results a well lit distant object (preferably the sun) should be focussed on the screen. What should be done for this purpose ?

1

- (A) Move the screen slightly away from the mirror
- (B) Move the mirror slightly towards the screen
- (C) Move the screen and the mirror away from the object
- (D) Move the screen and the mirror towards the object

33. To determine the focal length of a convex lens by obtaining a sharp image of a distant object we generally follow the following steps which are not in proper sequence.

1

- (a) Hold the lens between the object and the screen
- (b) Measure the distance between the lens and the screen
- (c) Select a well lit distant object

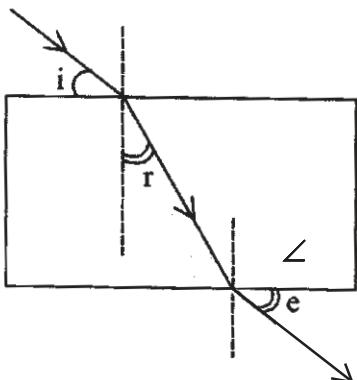
- (d) Place a screen opposite to the object on the lab table  
 (e) Adjust the position of the lens to form a sharp image

The correct sequence of these steps is :

- (A) c, a, d, e, b  
 (B) c, d, a, e, b  
 (C) c, d, e, a, b  
 (D) c, a, c, d, b

34. A student traces the path of a ray of white light through a rectangular glass slab and marks the angles of incidence ( $\angle i$ ), refraction ( $\angle r$ ) and emergence ( $\angle e$ ) as shown.  
 Which angle or angles has he **not** marked correctly?

1



- (A) i only  
 (B) i and r  
 (C) i and e  
 (D) r and e

35. While tracing the path of a ray of light passing through a rectangular glass slab a student tabulated his observations as given below:

1

S. No.	$\angle i$	$\angle r$	$\angle e$
I	$60^\circ$	$40^\circ$	$61^\circ$
II	$50^\circ$	$36^\circ$	$51^\circ$
III	$40^\circ$	$28^\circ$	$39^\circ$
IV	$30^\circ$	$20^\circ$	$31^\circ$

The correct observation is, :

- (A) I
- (B) II
- (C) III
- (D) IV

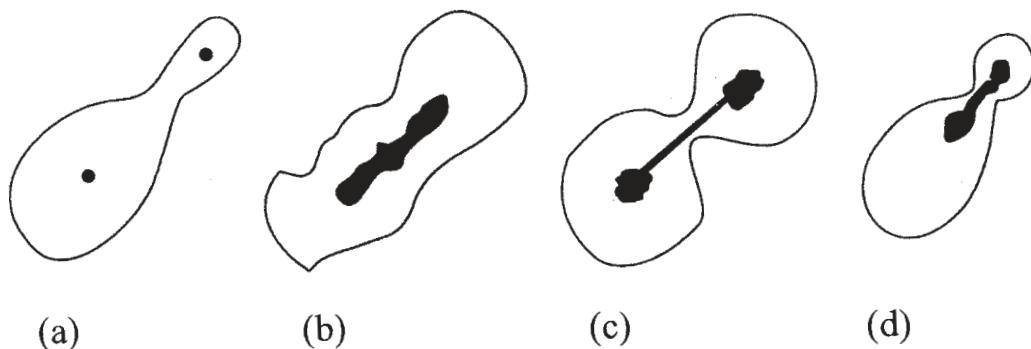
36. A student has to observe a permanent slide of binary fission in amoeba. Find the correct sequence of steps given below for focussing the object under a microscope.

1

- (a) Place the slide on the stage, look through the eye-piece and adjust the mirror to get proper illumination.
  - (b) Focus the slide sharp using fine adjustment screw.
  - (c) Look through the eye-piece and raise the objective lens using coarse adjustment screw till the object is focussed.
  - (d) Look through the eye-piece and move the slide till the object is visible.
- (A) d, c, b, a
  - (B) a, b, d, c
  - (C) a, d, c, b
  - (D) a, c, d, b

37. After viewing different slides, a student draws following diagrams. Select the one which depicts binary fission in amoeba.

1



(A) a

(B) b

(C) c

(D) d

38. After observing the prepared slides of binary fission in amoeba and budding in yeast following observations were reported:

1

- (a) Single cells of amoeba and yeast were undergoing binary fission and budding respectively.
- (b) Cytokinesis was observed in the yeast cell.
- (c) Elongated nucleus was dividing to form two daughter nuclei in amoeba.
- (d) A chain of buds were observed due to reproduction in amoeba.

The correct observation(s) is /are :

(A) a and c

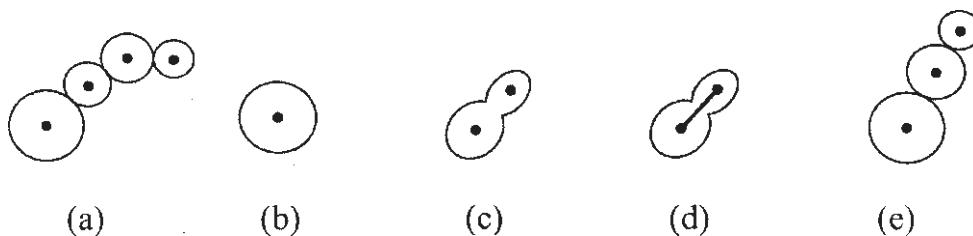
(B) b only

(C) c and d

(D) d, a and c

39. A student after viewing a prepared slide illustrates the budding in yeast in the following order which is not correct:

1



The correct order should be :

(A) b,c, d, e, a

(B) b, e, d, c, a

(C) b, d, e, c, a

(D) b, d, c, e, a

40. Dry raisins were soaked in water for 2 hours, to determine the percentage of water absorbed by raisins. Before final weighing of swollen raisins, the extra water left on the surface of soaked raisins was removed by : 1

- (A) gently rubbing with cotton cloth
- (B) hot air blower
- (C) dry cotton wool
- (D) filter paper

41. While performing the experiment with raisins to determine the percentage of water absorbed by them, a student made following measurements: 1

Mass of water in the beaker = 40 g

Mass of raisins before soaking = 5 g

Mass of raisins after soaking for 2 hours = 8 g

Mass of water left in the beaker after the experiment = 35 g

The percentage of water absorbed by raisins is :

(A)  $\frac{40 \text{ g} - 35 \text{ g}}{35 \text{ g}} \times 100$

(B)  $\frac{40 \text{ g} - 35 \text{ g}}{40 \text{ g}} \times 100$

(C)  $\frac{8 \text{ g} - 5 \text{ g}}{8 \text{ g}} \times 100$

(D)  $\frac{8 \text{ g} - 5 \text{ g}}{5 \text{ g}} \times 100$

**QUESTION PAPER DELHI (CODE NO. 31/1)**

**SECTION - A**

1. Write the name and formula of the second member of the carbon compounds having functional group – OH. 1
2. State one function of iris in human eye. 1
3. What happens when higher energy ultraviolet radiations act on the oxygen at the higher level of the atmosphere? 1
4. In a food chain, if 10,000 joules of energy is available to the producer, how much energy will be available to the secondary consumer to transfer it to the tertiary consumer? 1
5. Choose from the following:  
 ${}_6\text{C}$ ,  ${}_8\text{O}$ ,  ${}_{10}\text{Ne}$ ,  ${}_{11}\text{Na}$ ,  ${}_{14}\text{Si}$   
(i) Elements that should be in the same period.  
(ii) Elements that should be in the same group.  
State reason for your selection in each case. 2
6. An element 'X' belongs to 3rd period and group 17 of the periodic table. State its (i) electronic configuration, (ii) valency. Justify your answer with reasoning. 2
7. Name an organism which reproduces by spore formation. List three conditions favourable for spores to germinate and grow. 2
8. State the role of placenta in the development of embryo. 2
9. To construct ray diagram we use two light rays which are so chosen that it is easy to know their directions after reflection from the mirror. List these two rays and state the path of these rays after reflection. Use these rays to locate the image of an object placed between centre of curvature and focus of a concave mirror. 2
10. Draw a labelled ray diagram to illustrate the dispersion of a narrow beam of white light when it passes through a glass prism. 2

11. A star appears slightly higher (above) than its actual position in the sky. Illustrate it with the help of a labelled diagram. 2
12. List three problems which arise due to construction of big dams. Suggest a solution for these problems. 2
13. List the products of combustion of fossil fuels. What are their adverse effects on the environment? 2
14. What is meant by homologous series of organic compounds? Write the chemical formulae of two members of a homologous series and state which part determines the (i) physical properties, (ii) chemical properties, of these compounds. 3
15. Na, Mg and Al are the elements having one, two and three valence electrons respectively. Which of these elements (i) has the largest atomic radius, (ii) is least reactive? Justify your answer stating reason for each. 3
16. List and explain in brief three methods of contraception. 3
17. If we cross pure-bred tall (dominant) pea plant with pure-bred dwarf (recessive) pea plant we will get pea plants of  $F_1$  generation. If we now self-cross the pea plant of  $F_1$  generation, then we obtain pea plants of  $F_2$  generation.  
(a) What do the plants of  $F_1$  generation look like?  
(b) State the ratio of tall plants to dwarf plants in  $F_2$  generation.  
(c) State the type of plants not found in  $F_1$  generation but appeared in  $F_2$  generation, mentioning the reason for the same. 3
18. List in tabular form two distinguishing features between acquired traits and inherited traits, with one example of each. 3
19. How are fossils formed? Describe, in brief, two methods of determining the age of fossils. 3
20. State the types of mirrors used for (i) headlights and (ii) rear view mirrors, in cars and motorcycles. Give reason to justify your answer in each case. 3
21. A 4 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 24 cm. The distance of the object from the lens is 16 cm. Find the position, size and nature of the image formed, using the lens formula. 3

22. An old man cannot see objects closer than 1 m from the eye clearly. Name the defect of vision he is suffering from. How can it be corrected? Draw ray diagram for the (i) defect of vision and also (ii) for its correction.

3

23. What are hydrocarbons? Write the name and general formula of (i) saturated hydrocarbons, (ii) unsaturated hydrocarbons, and draw the structure of one hydrocarbon of each type. How can an unsaturated hydrocarbon be made saturated?

5

**OR**

What are detergents chemically? List two merits and two demerits of using detergents for cleansing. State the reason for the suitability of detergents for washing, even in the case of water having calcium and magnesium ions.

24. Distinguish between unisexual and bisexual flowers giving one example of each. Draw a diagram showing process of germination of pollen grains on stigma and label the following parts:

5

- (i) Female germ cell
- (ii) Male germ cell
- (iii) Ovary

**OR**

Draw a diagram of human female reproductive system and label the part

- (i) that produces eggs.
- (ii) where fusion of egg and sperm takes place.
- (iii) where zygote is implanted.

What happens to human egg when it is not fertilised ?

25. List the new Cartesian sign convention for reflection of light by spherical mirrors. Draw a diagram and apply these conventions for calculating the focal length and nature of a spherical mirror which forms a 1/3 times magnified virtual image of an object placed 18 cm in front of it.

5

**OR**

With the help of a ray diagram, state what is meant by refraction of light. State Snell's law for refraction of light and also express it mathematically.

The refractive index of air with respect to glass is  $2/3$  and the refractive index of water with respect to air is  $4/3$ . If the speed of light in glass is  $2 \times 10^8$  m/s, find the speed of light in (a) air, (b) water.

## SECTION B

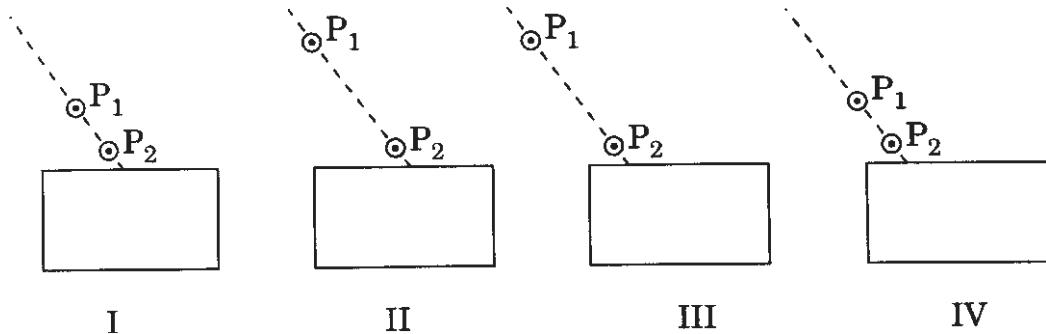
- |                                                                                                                                                                                                                        |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 26. The aqueous solutions of copper sulphate and zinc sulphate appear                                                                                                                                                  | 1 |
| (A) blue and green respectively                                                                                                                                                                                        |   |
| (B) green and colourless respectively                                                                                                                                                                                  |   |
| (C) blue and brown respectively                                                                                                                                                                                        |   |
| (D) blue and colourless respectively                                                                                                                                                                                   |   |
| 27. Solutions of copper sulphate, iron sulphate and zinc sulphate are prepared and marked I, II and III respectively. Few pieces of aluminium are added to each solution. After some time a change will be observed in | 1 |
| (A) I and II                                                                                                                                                                                                           |   |
| (B) II and III                                                                                                                                                                                                         |   |
| (C) III and I                                                                                                                                                                                                          |   |
| (D) All the three                                                                                                                                                                                                      |   |
| 28. On adding 2 mL acetic acid to 2 mL of water in a test tube, it was observed that                                                                                                                                   | 1 |
| (A) a clear and transparent solution is formed                                                                                                                                                                         |   |
| (B) a white precipitate is formed almost immediately                                                                                                                                                                   |   |
| (C) two separate layers were formed                                                                                                                                                                                    |   |
| (D) a colourless and odourless gas is evolved                                                                                                                                                                          |   |
| 29. On adding acetic acid to sodium hydrogen carbonate in a test tube, a student observes                                                                                                                              | 1 |
| (A) no reaction                                                                                                                                                                                                        |   |
| (B) a colourless gas with pungent smell                                                                                                                                                                                |   |

- (C) bubbles of a colourless and odourless gas  
(D) a strong smell of vinegar
30. Which one of the following are the correct observations about acetic acid? 1
- (A) It turns blue litmus red and smells like vinegar  
(B) It turns blue litmus red and smells like burning sulphur  
(C) It turns red litmus blue and smells like vinegar  
(D) It turns red litmus blue and has a fruity smell
31. A student has to determine the focal length of a concave mirror by obtaining the image of a distant object on a screen. For getting best result he should focus 1
- (A) a distant tree or an electric pole  
(B) a well-illuminated distant building  
(C) well-lit grills of the nearest window  
(D) a burning candle placed at the distant edge of the laboratory table
32. A student obtained a sharp inverted image of a distant tree on a screen placed in front of the concave mirror. He then removed the screen and tried to look into the mirror. He would now see 1
- (A) a very blurred image on the wall opposite to the mirror  
(B) an erect and magnified image of the tree in the mirror  
(C) no image as the screen has been removed  
(D) a highly diminished inverted image of the tree at the focus of the mirror
33. If you are to determine the focal length of a convex lens, you should have 1
- (A) a convex lens and a screen  
(B) a convex lens and a lens holder  
(C) a lens holder, a screen holder and a scale  
(D) a convex lens, a screen, holders for them and a scale

34. While performing the experiment on tracing the path of a ray of light through a rectangular glass slab, in which of the following experimental set-ups is a student likely to get best results?

$P_1$  and  $P_2$  are the positions of pins fixed by him.

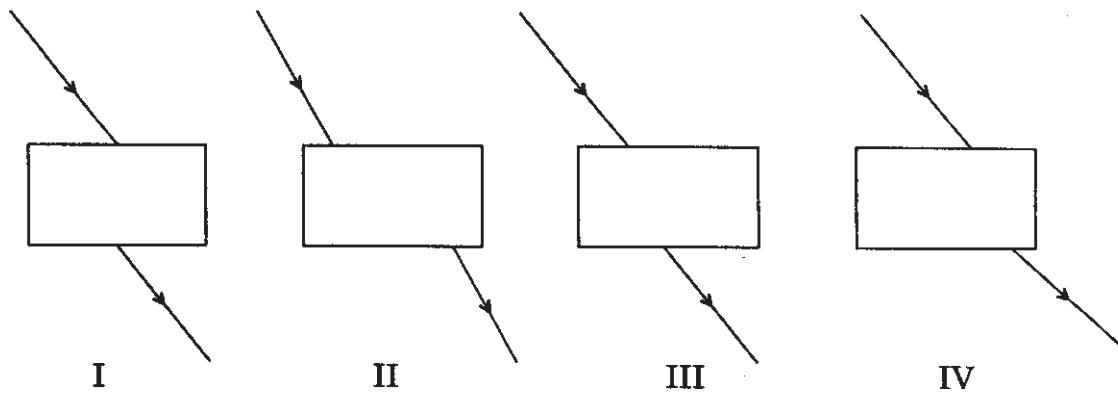
1



- (A) I  
(B) II  
(C) III  
(D) IV

35. Four students showed the following traces of the path of a ray of light passing through a rectangular glass slab.

1



The trace most likely to be correct is that of student

- (A) I  
(B) II  
(C) III  
(D) IV

36. Following diagrams were drawn by different students on having seen prepared slides of budding in yeast.



I



II



III



IV



V

Correct diagrams are

1

- (A) I, II, III  
(B) II, III, IV  
(C) III, IV, V  
(D) I, IV, V

37. In which of the following figures is budding not shown?

1



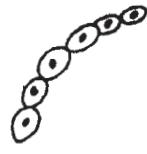
I



II



III

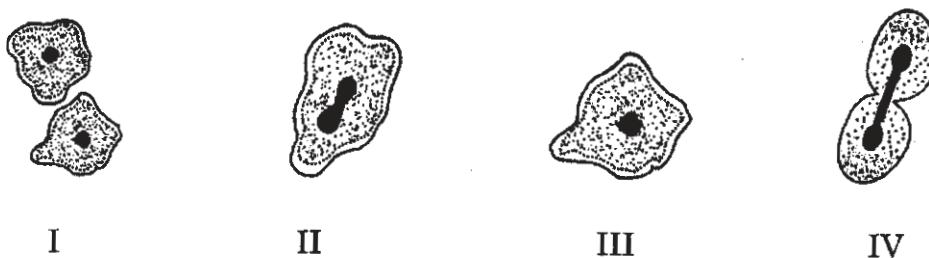


IV

- (A) I  
(B) II  
(C) III  
(D) IV

38. The following figures illustrate binary fission in amoeba in an incorrect sequence.

1



The correct sequence is

- (A) III, II, IV, I
- (B) III, IV, II, I
- (C) II, III, IV, I
- (D) IV, III, II, I

39. From the following diagrams, select the correct ones showing stages of binary fission in amoeba:

1



- (A) I, II, III
- (B) IV, II, III
- (C) V, II, III
- (D) IV, I, III

40. A student weighed some raisins and recorded the weight as 'x'. She then soaked the raisins in distilled water. After about 2 hours she removed the raisins, wiped them dry and weighed again and recorded that as 'y'. The percentage of water absorbed by raisins may be determined using the relationship

1

(A)  $\frac{y - x}{y} \times 100$

$$(B) \frac{y - x}{x} \times 100$$

$$(C) \frac{y - x}{x} \times \frac{1}{100}$$

$$(D) (y - x) \times 100$$

41. In the experiment for determining the percentage of water absorbed by raisins, we do the final weighing of the raisins after keeping them dipped in water for about one hour. For the accuracy of the result, the extra water from the surface of the soaked raisins is removed by

1

(A) rubbing with cotton cloth

(B) hot air blower

(C) dry cotton wool

(D) filter paper

**QUESTION PAPER FOR BLIND CANDIDATES**  
**[CODE NO. 31(B)]**

**SECTION - A**

1. Write the name and formula of an organic compound having functional group – CHO. 1
2. Give one example of a phenomenon where Tyndall effect is observed. 1
3. Define the term bio-magnification. 1
4. What is one important function of ozone in the upper atmosphere ? 1
5. How does the metallic character of elements change on moving from left to right along a period in the modern periodic table? State reason for this change. 2
6. The electronic configuration of an element 'X' is 2, 8, 7.
  - (a) To which group and period does 'X' belong?
  - (b) How many electrons are present in its outermost shell and what is its valency? 2
7. State the meaning of vegetative propagation. List two plants grown by this mode. 2
8. What is the genetic difference between sperms and eggs in case of humans ? What is its significance in reproduction ? 2
9. The magnification produced by a spherical mirror is "+  $\frac{1}{10}$ ". Analysing this value, state (i) the type of the spherical mirror it is, (ii) three characteristics of the image formed by the mirror. 2
10. The sun is visible to us 2 minutes before the actual time of sunrise. Why? 2
11. What is meant by the power of accommodation of human eye ? What is the distance of near and far points of a normal eye? 2
12. State the reasons for considering coal and petroleum as (i) fossil fuels and (ii) non-renewable sources of energy. 2
13. List two ultimate benefits of 'Chipko Andolan' to the local people. 2

14. Distinguish between ethanol and ethanoic acid on the basis of (i) litmus test, (ii) reaction with sodium hydrogen carbonate. Name the oxidising agent used in the conversion of ethanol to ethanoic acid. 3
15. The elements Li, Na and K each having one valence electron are in period 2, 3 and 4 respectively. (i) In which group should they be ? (ii) Which one of them is least reactive ? (iii) Which one of them has the largest atomic radius? Give reason to justify your answer in each case. 3
16. State three methods of contraception practised to avoid pregnancy, giving one example of each. 3
17. A blue colour flower plant denoted as BB is crossbred with that of pink colour flower plant denoted as bb.  
(a) State the colour of flower you would expect in their  $F_1$  generation plants.  
(b) If flowers of  $F_1$  plants are self-pollinated, what will be the expected percentage of pink colour flower plants in  $F_2$  generation?  
(c) State the expected ratio of the genotypes BB and Bb in the  $F_2$  progeny. 3
18. State the meaning of 'speciation'. List four factors responsible for speciation. 3
19. What is meant by fossils ? State in brief two ways of estimating the age of fossils. 3
20. Define the power of a lens and write its S.I. unit. Name the type of lens which has a negative power. Calculate the power of a concave lens whose principal focus is at a distance of 50 cm from its optical centre. 3
21. A 5 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 30 cm. The distance of the object from the lens is 20 cm. Use lens formula to find the position, size and nature of the image formed. 3
22. What is hypermetropia? List two causes for the development of this defect. State in brief how this defect of vision can be corrected. 3
23. State briefly two properties of carbon which lead to the huge number of carbon compounds we see around us. Give reason why most of the carbon compounds (i) are covalent, (ii) are very stable. Name three different kinds of covalent bonds found in the organic compounds.

**OR**

- (a) What is homologous series of carbon compounds? Write its any two characteristics. Generate the homologous series for compounds, having  $\text{CH}_3\text{OH}$  as its first member.
- (b) Which compounds are called (i) alkanes (ii) alkenes and (iii) alkynes ? Which of them is  $\text{C}_2\text{H}_4$  ?
24. Explain briefly the role of (i) testis, (ii) seminal vesicle, (iii) vas deferens, (iv) ureter, and (v) prostate glands in human male reproductive system.

**OR**

State in brief the changes that take place in a fertilized egg (zygote) till birth of the child in the human female reproductive system. What happens to the egg when it is not fertilized ?

5

25. List the five sign conventions for reflection of light by spherical mirrors. Apply these conventions in the determination of nature and focal length of a mirror which forms a five times. magnified virtual image of an object placed 8 cm in front of the mirror.

**OR**

What is a spherical lens ? What are its two types ? Explain in brief the terms (i) principal axis, (ii) optical centre and (iii) aperture of a spherical lens. A burning candle and a screen are placed 40 cm apart. When a spherical lens is placed exactly in the middle of the two, a sharp image of the flame is obtained on the screen. What is the focal length of the lens ? Also state the nature and size of the image formed.

5

**SECTION B**

26. How can a student identify ethanoic (acetic) acid ?

1

By

- (A) only smelling it  
(B) only tasting it  
(C) only touching it  
(D) smelling and tasting it

27. A student took four test tubes P, Q, R and S containing freshly prepared  $\text{CuSO}_4$ ,  $\text{ZnSO}_4$ ,  $\text{FeSO}_4$  and  $\text{Al}_2(\text{SO}_4)_3$  respectively. He placed a small iron nail in each. He found some deposit on the nail in the test-tube,

1

- (A) P  
(B) Q  
(C) R  
(D) S

28. Four students P, Q, R and S studied the properties of acetic acid and noted their observations in the following table. Find who was correct.

1

Student	Odour		Miscibility with water	
	Like Onion	Like Vinegar	Miscible	Partially Miscible
P	✗	✗	✓	✗
Q	✗	✓	✗	✓
R	✗	✓	✓	✗
S	✓	✗	✓	✗

- (A) P  
(B) Q  
(C) R  
(D) S

29. In litmus test, a student would observe that acetic acid turns

1

- (A) blue litmus red  
(B) red litmus blue  
(C) blue litmus colourless  
(D) red litmus colourless

30. On adding sodium hydrogen carbonate to acetic acid, a gas is evolved which turns lime water milky due to the formation of

1

- (A) Calcium acetate  
(B) Calcium carbonate  
(C) Calcium bicarbonate  
(D) Calcium hydroxide
31. To find the focal length of a convex lens, a student has to focus a distant object. For best results, out of the following, which one would you suggest to him to select as an object for this purpose ? 1
- (A) Grills of the nearest window  
(B) A distant tree  
(C) A distant tall building  
(D) The sun
32. For determining the focal length of a concave mirror by obtaining the image of a distant object, one should use as the object 1
- (A) a well-illuminated distant electric pole  
(B) a distant tree  
(C) window grill in the laboratory  
(D) a lighted candle kept at the distant edge of the table
33. A student obtains a blurred image of a distant object on a screen by using a concave mirror. In order to obtain a sharp image he will have to shift the mirror 1
- (A) slightly towards the object  
(B) slightly towards the screen  
(C) to a position very far away from the screen  
(D) slightly either towards or away from the screen depending upon the position of the object
34. For tracing the path of a ray of light through a rectangular glass slab, the angles of incidence for better result should be between 1
- (A)  $12^\circ$  and  $25^\circ$

- (B)  $30^\circ$  and  $55^\circ$   
 (C)  $60^\circ$  and  $80^\circ$   
 (D)  $65^\circ$  and  $85^\circ$
35. After tracing the path of rays of light through a glass slab for three different angles of incidence, a student measured the corresponding values of  $\angle r$  and  $\angle e$  and recorded them in the table given below:
- | S.No. | $\angle i$ | $\angle r$ | $\angle e$ |
|-------|------------|------------|------------|
| I     | $30^\circ$ | $20^\circ$ | $31^\circ$ |
| II    | $45^\circ$ | $28^\circ$ | $44^\circ$ |
| III   | $60^\circ$ | $34^\circ$ | $59^\circ$ |
- The correct observations are
- (A) I and II only  
 (B) II and III only  
 (C) I and III only  
 (D) All the three I, II and III

36. A student observed the slide of a unicellular organism having elongated nucleus. This slide represents
- (A) budding  
 (B) binary fission  
 (C) multiple fission  
 (D) binary and multiple fission both
37. A student has to adjust a compound microscope to observe a prepared slide of budding in yeast. He must follow the following steps which are not in proper sequence:
- Adjust the diaphragm and the mirror so that sufficient light enters the microscope.
  - Place the slide on the stage.

III. Adjust to high power and focus.

IV. Focus using low power.

The correct sequence of the above steps is

1

(A) I, II, IV, III

(B) II, I, III, IV

(C) II, I, IV, III

(D) II, IV, I, III

38. After observing the slides showing different stages of reproduction in amoeba and yeast, four students, I, II, III and IV, reported their observations as given below :

- I. Single cells of amoeba and yeast were showing binary fission and budding respectively.
- II. Cytokinesis was seen in the yeast cell.
- III. Chain of buds were seen due to reproduction in amoeba.
- IV. Elongated nucleus was dividing to form two daughter nuclei in amoeba.

The correct observations are that of students

1

(A) I and II

(B) II and III

(C) III and IV

(D) IV and I

39. A student observes a prepared slide which shows a cell dividing in the centre. This slide could be representing

1

(A) budding in amoeba

(B) budding in yeast

(C) binary fission in amoeba

(D) binary fission in yeast .

40. While performing an experiment to determine the percentage of water absorbed by raisins, a student observes that the mass of raisins has increased by 3 g after keeping them dipped in water for nearly 2 hours. If the final mass of the soaked raisins was 15 g, the percentage of water absorbed by the raisins is 1
- (A) 20%  
(B) 25%  
(C) 30%  
(D) 40%
41. In the experiment for determining the percentage of water absorbed by raisins, which of the following methods would you prefer for removing the extra water from the soaked raisins before final weighing ? 1
- (A) Wiping gently using dry cotton wool  
(B) Keeping wet raisins in the sun  
(C) Wiping gently using filter paper  
(D) Blowing hot air over the soaked raisins